P2 Metal Finishing Technologies Pilot Stakeholder Meeting Summary

January 28, 2002

LIST OF ATTENDEES

Name		Affiliation
Shayla	Barrett	Indiana Clean Manufacturing Technology & Safe Materials Institute
Donn	Brown	Concurrent Technologies Corporation (CTC)
Rich	Burton	ACME Industrial
Paul	Chalmer	National Center for Manufacturing Sciences
George	Cushnie	CAI Resources Inc. / National Metal Finishing Resource Center
Gus	Eskamani	CAMP, Inc.
Peter	Gallerani	Integrated Technolgies, Inc.
Glen	Graham	OC - ALC / LPPEE Tinker Airforce Base
Ken	Hankinson	KCH Services, Inc.
Randy	Kraemer	Kohler Co.
Brian	Manty	CTC
Scott	Maurer	CTC
George	Moore	U.S. Environmental Protection Agency (EPA)

Kelly	Mowry	National Association of Metal Finishers / Gull Industries
Fred	Mueller	Laird Technologies, Inc.
Linda	Mustue	Elisha Technologies Company, LLC
Percy	Peltzer	CTC
Tony	Revier	Uyemura, International
Bill	Saas	Taskem, Inc
Howard	Saunders	AESF / Nashville Wire
Chris	Start	Michigan Manufacturing Technology Center
Jim	Totter	CTC
Ian	Tunnicliffe	Lobo Liquids, LLC
Deborah	Valin	Florida Department of Environmental Protection (FDEP)
Ernest	Walen	Heatbath Corporation / MFSA
Nabil	Zaki	SurTec International / Metal Finishing Suppliers Association (MFSA)

MEETING SUMMARY

Background

The ninth meeting of the Stakeholder Advisory Group for the Environmental Technology Verification for Metal Finishing Pollution Prevention (P2) Technologies (ETV-MF) Program began at 12:00 p.m. on January 28, 2002, at the Rosen Center Hotel in Orlando, Florida. The meeting was conducted in conjunction with the American Electroplaters and

Surface Finishers (AESF) / U.S. Environmental Protection Agency (EPA) Conference for Environmental Excellence.

Donn Brown, Concurrent Technologies Corporation (CTC) Manager, Environmental Verification, began the meeting by welcoming everyone and thanking the group for taking the time to attend during the conference. Mr. Brown summarized the objectives and agenda for the meeting. The agenda identified program-level and project-level status reports to be presented by program partners and participants, as well as future plans, and an EPA ETV Program overview.

Stakeholder Meeting Presentations

Mr. Brown then went on to briefly review topics discussed at the last Stakeholder Meeting held June 28, 2001, at AESF SUR-FIN Conference in Nashville, Tennessee. This was a recap of previous discussions on technology test status and partnering opportunities that enhance information dissemination to the states and identify additional funding opportunities. Next Mr. Brown highlighted some of the accomplishments since the last meeting. The program finalized and posted three Verification Test Reports on the EPA ETV and ETV-MF websites. They included the BioClean, the USFilter RETEC, and the MART Corporation technologies. The Davis Technologies Verification Report has been prepared and will be either finalized or revised to incorporate data from a planned re-test. Five verification tests have been completed since the SUR-FIN 2001 stakeholder meeting, including tests for Hadwaco, Hydrometrics, Kaselco, KCH Services, and LOBO Liquids technology vendors. A draft test plan is being prepared for the QVF Process Systems Evaporator Technology.

Mr. Brown then pointed out some successful outreach efforts that have taken place since SUR-FIN 2001. Presentations were made to disseminate the MART Corporation EQ-1 test results at the Joint Services P2 Conference and the Davis Technologies test results and aqueous cleaner recycling technology performance at a regional AESF conference. The test results presented at these conferences were well received by industry. The Hydrometrics, Inc., Reverse Osmosis test results will be presented later during AESF Week 2002. Mr. Brown stated that the overall ETV Program and the ETV-MF Program were highlighted in the November/December 2001 issue of CleanTech Magazine, which was distributed to the stakeholders for review.

Mr. Brown then highlighted various regulatory and economic development organizations that have been contacted in states where current vendors and potential test sites reside, including Arizona, California, New York, Massachusetts, Idaho, North Carolina, Connecticut, Alabama, Colorado, Michigan, and Florida. Mr. Brown reiterated that partnering with state, local, and regional consortia would enhance information diffusion to industry and supplement EPA ETV funding.

Mr. Brown closed the introduction by stating that insufficient funds remain to test the remaining eight technologies that have applied to be tested by the ETV-MF Program and that there would be a significant lag time of potentially a year and a half until the

stakeholders met again and progress is resumed on the backlog of technologies. Kelly Mowry, Gull Industries / National Association of Metal Finishers (NAMF) President, voiced his concern that the ETV-MF Program will lose vendor and industry interest, technical expertise, and momentum without the funding support of EPA to continue the program. Mr. Mowry asked if EPA could expedite funding to the ETV-MF Program, if not in full, then at some lower level to keep the stakeholder advisory group involved and continue the very important outreach efforts to distribute test results and keep the program visible to industry. The metal finishing industry is counting on ETV-MF Program test results more than ever for making purchasing decisions to help meet the proposed Metal Products and Machinery (MP&M) regulations expected to be finalized in December 2002. George Moore, Ph.D., of EPA stated that FY02 funding is only available for the current five ETV Centers (Advanced Monitoring Systems, Air Pollution Control, Greenhouse Gas, Drinking Water Systems, and Water Quality Protection Technologies). The P2 Metal Finishing Technologies Program is not being recognized as a center at present. The P2 Metal Finishing Technologies and Innovative Coatings and Coating Equipment Programs will be combined into a P2, Recycling, and Waste Treatment Center in the future when a solicitation is issued and the contract awarded through a competitive bid process. Dr. Moore concurred with Mr. Mowry in noting that EPA is concerned with being able to recapture the P2 Metal Finishing Technologies Pilots expertise and momentum gained to date. Dr. Moore stated that he would provide more information on this topic to the stakeholders during his presentation later in the meeting.

Peter Gallerani of Integrated Technologies, Inc. (ITI), then gave a brief description of the Hadwaco Mechanical Vapor Recompression (MVR) technology and the captive copper pickling application on which it was tested. A brief description of the technology and discussion of the test results were presented.

Percy Peltzer of CTC noted that the payback period would be in excess of a year. Howard Saunders, Nashville Wire / American Electroplaters and Surface Finishers (AESF) Society President, pointed out that it would be valuable to Metal Finishers to identify the drivers for a given P2 technology installation in the report. It was noted that an increase in production throughput and a reduction in rejected product were major drivers, along with water reuse and energy savings.

Chris Start of the Michigan Manufacturing Technology Center (MMTC) then discussed the project status of the Hydrometrics, Inc., High Efficiency Reverse Osmosis (HEROTM) Industrial Wastewater Treatment System. Mr. Start stated that this test was conducted at the Department of Energy Kansas City Plant (KCP), which is operated by Honeywell Federal Manufacturing & Technology. Mr. Start projected a February 2002 delivery of the Verification Report and Statement. Mr. Start then discussed the broad scope of KCP plating operations and the HEROTM technology test configuration as well as the overall goals and additional project objectives of the verification test, including copper recovery and water reuse within the KCP facility. Analytical results, along with contaminant removal efficiency, wastewater recovery efficiency, waste generation, and cost figures, were presented.

George Cushnie of CAI Resources Inc. presented a status report on the Kaselco Electrocoagulation System and Lobo Liquids Ion Exchange System. Mr. Cushnie described the test site as being Gull Industries, in Houston, Texas, owned and operated by Kelly Mowry.

Mr. Cushnie then proceeded to describe the two technologies and their theory of operation along with the proposed test configurations and objectives at Gull Industries. Test procedures were discussed in detail for each system along with the timeline of each verification test project. Draft verification reports are anticipated in April 2002 for the Kaselco and Lobo Liquids technologies.

Ian Tunnicliffe of Lobo Liquids, LLC, presented a vendor's perspective on the ETV-MF Program. Mr. Tunnicliffe briefly described Lobo Liquids as a Houston-based company that furnishes rinse water recycling technologies. Lobo Liquids has five patent-pending technologies. Mr. Tunnicliffe went on to illustrate the Gull Industries installation as a fully automated three-stage ion exchange system that returns plating rinse water for reuse within the facility. Mr. Tunnicliffe then went on to describe the system, including its PC-based monitoring and control features.

Mr. Tunnicliffe pointed out some vendor benefits of the EPA-ETV Program. According to Mr. Tunnicliffe, the program enhances the marketability of the system, reduces sales cycle time, establishes company and product quality, broadens customer base, and maximizes sales potential with minimum overhead.

Mr. Tunnicliffe's comments on the test protocol were that it was concise and well written. Additionally, he thought that the implementation of the test plan proved to be a good self-evaluation exercise. The vendor explained that the ETV policy to publish results good or bad and disseminate the results were both excellent features of the program.

Gus Eskamani of CAMP, Inc., reported on the status of the KCH Services, Inc., Automated Covered Tank System for Energy Conservation (ACTSEC) verification test project. The operating procedures and conditions were described in detail along with the KCH ACTSEC technology operation as installed at BFGoodrich in Tullahoma, Tennessee.

ACTSEC test objectives included a detailed evaluation of energy and cost savings as well as environmental benefit, and the elements of energy to be metered were identified. Several photos were presented that showed the production line at the host test site facility. Mr. Eskamani wrapped up with a discussion of the project schedule, projecting a draft report in March 2002.

Kelly Mowry noted the importance of discussing the potential applicability of the KCH ACTSEC Technology to the National Emissions Standard for Hazardous Air Pollutants (NESHAP) for hard chrome and chrome PEL. Mr. Mowry then asked if there was a difference between full installation and retrofit for the technology. Mr. Ken Hankinson addressed the question by saying that a retrofit is different than a "ground up"

installation, but that a retrofit could be done.

Peter Gallerani of ITI provided a status report for the QVF Vacuum Evaporator Technology used for chemical recovery. Mr. Gallerani described the host test facility, Plating Plastics Industries, as an electroplating job shop. Mr. Gallerani went on to explain that the process line is a chromic-sulfuric acid plastic etch with wastewater generation of approximately 2,400 gallons per day. Next the process flow was illustrated along with a proposed test procedure and data collection strategy for the vacuum evaporator technology. Mr. Gallerani then presented the current project schedule highlighting the draft test plan completion in March 2002.

Future Project Plans

Next Donn Brown presented "Future Project Plans." Mr. Brown discussed the ETV-MF Team's commitment to complete the final seven verification test reports. By next July, there will be a total of 11 verification reports finalized by the ETV-MF Program. Mr. Brown went on to state that additional follow-up is planned with EPA and the states to identify additional partnering and funding opportunities to initiate testing the backlog of technologies. Next Mr. Brown distributed a handout that identified the eight technologies in backlog (see Appendix A), each with a test site already identified and ready to initiate the verification testing process.

Next Mr. Brown gave a brief status on partnering efforts and developments. He discussed the ETV interest in establishing partnering arrangements with state, local, and other organizations such as technical associations, the Department of Defense, and the Department of Energy to obtain support for future ETV-MF verification tests and enhance information dissemination. A letter of intent is the initial step, followed by proposals and applications directed to organizations with a stake in ETV-MF projects. A Memorandum of Agreement (MOA) will be the vehicle used to secure a partnering arrangement.

Communications with the Michigan Department of Environmental Quality (MDEQ) have been underway to research project suitability for a $50,000 grant opportunity available for P2 Technology Demonstration in Michigan. While this grant is specifically intended for chemical manufacturers in the state of Michigan, not metal finishers, Mr. Brown illustrated this grant as an example of potential future funding opportunities. Mr. Brown went on to say that the MDEQ expressed an interest in some sort of partnership with the ETV-MF Program and that the MDEQ is planning to prepare a formal letter of partnering intent with the ETV-MF Program.

Mr. Brown continued to discuss communications that have been initiated with other state environmental organizations. The Alabama Department of Environmental Management (ADEM) is currently exploring grant opportunities and other funding vehicles for the BIOMIN Technology at Gulf Plating in Mobile, Alabama. Current work is underway to identify project scope and possible areas of collaboration with the ADEM.

The Arizona Department of Environmental Quality (ADEQ) is currently exploring grant opportunities and other funding vehicles for the BASX Technology at METCO in Phoenix, Arizona.

The Florida Department of Environmental Protection (FDEP) is currently exploring grant opportunities and other funding vehicles. A draft proposal is being prepared that will identify potential projects and possible areas of collaboration with the FDEP. Deborah Valin of the FDEP mentioned that an area of interest is the reduction of municipal solid waste streams, and that recycling grants have been issued in the past by FDEP.

Finally, the ETV-MF Program will explore the use of the ETV Program/Massachusetts MOA for a collaborative effort in testing the CASTion Technology at Columbia Manufacturing in Massachusetts. The State of Massachusetts is very interested in this project based on the value to metal finishers within the state.

EPA's Environmental Technology Verification Program

Next, Dr. George Moore of EPA recapped the ETV process and shared ETV statistics published in June 2001. Dr. Moore introduced figures on the number of stakeholders (1062), meetings held (89), Protocols (60), test plans (84), applications pending (138), technologies in testing (111), and technologies verified (118). Additionally, Dr. Moore took time to identify the roles of instrumental players involved in the ETV program.

Dr. Moore pointed out that vendors from some 41 states and 8 countries have played a major role in the program's success. Slides of the ETV Verification Statement and Vendor Participation/Completion Placards were also presented. ETV Program success factors were presented as follows: meaningful stakeholder participation for market input; private-sector partnerships for efficient testing; technology-specific peer-reviewed protocols for comparability; test-specific quality assurance plans and implementation; Web publication for speed and universal availability; an EPA Team approach for programmatic consistency; and technical expertise and credibility.

Next ETV vendor contributions were presented including a total of $1.4M in vendor contributions (not including in-kind cost) and an average vendor contribution range increasing from $0 in FY96 to $721,500 in FY00. Additionally, average vendor contributions during the pilot period increased from $26,000 in FY97 to $90,200 in FY00. Dr. Moore pointed out that there are six ETV Technology Centers planned and that the future P2, Recycling, and Waste Treatment Center will be comprised of the P2 Metal Finishing Technologies Pilot, the Innovative Coatings and Coating Equipment Pilot, and the P2 Recycling and Waste Treatment Pilot as well as other emerging P2 focus areas. The current idea for ETV financial support was introduced, as were some key questions that definitely have direct impact on the ten-year plan. Peter Gallerani asked when EPA thought the solicitation for the new P2 Recycling and Waste Treatment Center would be issued. Dr. Moore stated that he did not know when, and did not know what funding level would be set for the new center. Donn Brown thanked the stakeholders for attending and adjourned the meeting.

APPENDIX A

ETV-MF Program Technologies in Backlog

Technologies in Backlog

Vendor	Technology Type	Planned Test Application
PureCycle Environmental Technologies	Diffusion Dialysis	Removes aluminum and recycles sulfuric acid back to anodizing bath in-process, thereby reducing the amount of F006 hazardous waste generated
CASTionÒ Corp.	Controlled Atmosphere Separation Evaporator	Separates chrome and nickel electroplating chemicals from rinse water in-process for reuse in the process, resulting in zero discharge and almost eliminating F006 hazardous waste
Wastwater Engineers, Inc.	Flocculation/Filtration	Removes oil and metals from aqueous cleaners, metal working fluids, and rinse water streams; encapsulated sludge passes TCLP
MacDermid, Inc.	Electrodialysis	Greatly extends the life of electroless nickel plating baths, thereby reducing the volume of hazardous waste generated each year
Renovare International, Inc.	Electrowinning	Plates out metals from rinse water or process baths, on an electrode, for reclamation, reducing hazardous waste generation, and recycles rinse water
BIOMIN, Inc.	Organoclay/Filtration	Removes cadmium, chromium, aluminum, and gold from rinse water, significantly reducing the volume of hazardous waste, and recycles water back to rinse tank
BASX Systems	Microfiltration Technology	Removes copper, tin, zinc, and nickel from electroplating rinse water; the

		metals are recovered for reuse and rinse water is recycled, thereby greatly reducing hazardous waste volume
Environmental Research and Development, Inc.	Neutral Precipitation followed by Microfiltration	Reduces the volume of hazardous sludge generation through innovative treatment of wastewater containing copper, antimony, zinc, and chromium